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TECHNOLOGY DEPT.

SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE • SEPTEMBER 1, 1945



Artificial Shower

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A SCIENCE SERVICE PUBLICATION

ELECTRONICS

Deadly Bombers

Radio-radar robot planes, with world-spanning flight ranges will send humanity back to cave-dwelling, unless we learn how to keep the peace.

► THE radio-radar robot bombers described by Gen. H. H. Arnold will turn men into moles if we insist on settling international arguments by war. No city or fortress or factory on land, no convoy or even single ships at sea, can count on safety if unmanned planes or rockets can now or in the near future be guided by radio to the vicinity of the target, and then finish in Kamikaze dives, pinpointed into their targets by "heat, light and metal reactions."

Camouflage will do no good, for radar ignores such flimsy concealments as nets and painted rags as completely as it does smoke screens or natural fog. It "sees" the hard surfaces beneath the concealment and reports their whereabouts with the ruthless accuracy of the machine that it is.

If vital military installations are to be concealed from the radar's pitiless eye they must be given a "soft" covering, deep enough to give the same effect as natural soil and the vegetation growing on it. And the most practicable way to do this is to use soil and vegetation themselves rather than strain after facsimile effects.

This would mean putting underground industrial plants and warehouses, hangars and railway stations, barracks and hospitals, in brief the whole enormous complex of a civilization's material basis. Some advantage might be taken of natural caves and abandoned mines, as the Germans are reported to have done to some extent in the war that ended last spring. But most of the caves would have to be dug by the men who would later take up their troglodyte existence in them.

Deep burial would probably be the safest in the end, no matter how much more it might cost. For plenty of earth overhead would be the only chance of safety against the atomic explosives which the future far-ranging robot bombers would doubtless carry. In the end, even hundreds of feet of self-burial might not suffice for protection against a foe really determined to dig out and destroy the new race of human moles.

Even vainer than seeking safety from the terrors of the newer warfare by dig-

ging in the bowels of the earth are the proposals to "forbid" the use of such weapons in war. Historical records abound in such efforts—all ending in failure. One needs only recall the well-intentioned proposals put forward at earlier peace conferences at the Hague, to ban the use of poison gas and of aircraft in war—to neither of which the American delegates would agree.

Duelling in civilized communities was stopped not by forbidding the use of pistols in duels but by the pressure of public opinion against the practice itself and by the use of police force against bellicose gentlemen who insisted on waging little private wars. If nations are to be similarly restrained from mutual slaughter, it must be by the larger-scale application of one or both of these principles.

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ZOOLOGY

Worm Is Both Father And Mother to Offspring

► WORMS that live in sea-bottom mud have been shown capable of producing offspring sexually yet without the necessity of mating, the same individual being both father and mother. A brief report on this curious phenomenon is given in *Science* (Aug. 17) by Dr. William C. Purdy, retired biologist of the U. S. Public Health Service, now living in Cincinnati.

Many of the lower animals are both male and female, functioning as mothers at one time, as fathers at another; oysters and earthworms are common examples. There are others, also, that can produce offspring through many generations of unmated females; a much-too-common example of this is furnished by the ordinary aphid or plant louse. But a "male-female" animal that is both sexes at once, or in such quick alternation that it can be both father and mother to the same offspring, seems to be something of a rarity.

Dr. Purdy placed solitary individuals of his worms in small glass vials, each with enough mud to give it shelter and a chance to build the hard tubes the worms use for protection. The mud had

been carefully searched with a microscope, to make sure it sheltered no other worms and contained no worm eggs. Then each worm was left to its own devices, except for weekly feedings.

Presently young worms began to appear. Six of the one-worm cultures, at the end of about seven months, had produced a total of 208 young. Another, kept for two years, produced 19 young during the first year and 148 during the second.

Dr. Purdy's worms represented two genera, known to zoologists as *Tubifex* and *Limnodrilus*.

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AERONAUTICS

Transport Helicopter Has Two Rotors in Tandem

► A PASSENGER or cargo helicopter with two rotors, one mounted at the front and the other at the rear on the body, has passed successful tests in the air. It is claimed to be the first successful design using two rotors in tandem, and the first helicopter for air transport operations. Its capacity is 10 passengers. It was built for the U. S. Navy, and additional craft of the same type are under construction.

This largest of helicopters so far constructed was designed and constructed by P-V Engineering Forum, Inc., and was given its first test in the air during March this year. In the air, it resembles somewhat a gigantic center-sagging flat-bottomed row-boat, suspended from two knobs, one at each end. In reality these knobs house the rotor mechanisms, and turn the rotors which are above them.

The streamlined fuselage of the craft is 48 feet long and 13 feet high. Its Continental-Wright R-975 engine is completely enclosed aft of the cabin. Flight tests prove that the craft has unusual stability and control characteristics, and is one of the fastest helicopters flying. Its high efficiency represents, it is claimed, the biggest step forward in helicopter design since the original Sikorsky.

This new helicopter, designated the PV-3, can land in a 100-foot-diameter clearing on land or water. Because of this, it is pronounced ideal for picking up wounded men from inaccessible areas. Equipped with either an external or internal hoist, it can perform rescues while hovering in the air close to ground or water surfaces.

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Spain's principal agricultural crop is grapes, with olives second.

AERONAUTICS

VHF for Safe Landings

Instruments make it possible for planes to land through overcast skies at three-minute intervals. Use very high frequency radio.

► **SAFE AIRCRAFT** instrument landings at overcast airports at three-minute intervals are now possible by a new technique and very high frequency radio apparatus developed by the U. S. Civil Aeronautics Administration at its experimental station in Indianapolis at the municipal airport. By this method approximately 20 planes can be brought safely in on a single runway in an hour, while under the usual method the number is only four or five. It doubles the number of instrument landings an hour over that obtained in a method demonstrated only two months ago at the Washington, D. C., airport by the same organization.

The new method assists greatly in solving one of the most serious problems facing commercial and private flying with the greatly increased use of airways now expected. With high visibility and good flying and landing conditions, planes can safely land at a rate approximately 60 an hour on a single runway. When visibility is such that landings must be by instrument, approaching planes, under radio orders from the control tower at the port, must be "stacked up," circling at levels 1,000 feet above each other at some distance from the field, waiting often an hour or more before they can be permitted to land.

Very high frequency radio, called VHF for short, is the key to the new technique. Its great advantage is that the VHF channel is basically static-free. With the present lower frequency radio static causes much difficulty, and it is worse in bad weather when clear reception is most needed. Approach guidance is by means of a localizer element, also operated on VHF.

The new technique does not employ radar, but later, when certain developments now under way are more nearly perfected, a combination of the VHF control and radar will probably be used. This will help the tower control man "see" approaching and stacked planes, and, perhaps, result in instrument landings at the rate good weather landings are now made.

The technique of stacking and communication with the stacked planes is

important in the new method. Planes are held behind a radio vertical "fan marker" 10 miles from the tower on the approach airway. With the VHF radio equipment all pilots in the stack can hear the instructions to any individual plane, and therefore be ready for immediate action when their specific instructions come. This is a time-saver. When they hear the lowest plane in the stack ordered in, they know that each of them in turn will be lowered a thousand feet, and the pilot of the new low plane adjusts himself to be at the marker at the exact time designated by the tower man.

In a recent demonstration made for visiting scientists and aviation experts, five CAA planes participated in instrument landings under the new technique. The visitors, by means of loud speakers attached for the occasion, could hear the instructions to the pilots and their acknowledgments. The five planes made landings at intervals varying only a few seconds over or under the three-minute intervals.

When the first plane had covered about half the distance from the 10-mile fan marker to the airstrip it had glided down to perhaps a thousand feet of the earth, and the second plane was in place at the marker at a 2,500-foot level and immediately, when ordered, followed the first one in.

The government aeronautics experimental station in Indianapolis is maintained by the Civil Aeronautics Administration to develop aids to flying. It is not an institution for research and invention. Its job is to bring to practical application inventions originating in the aviation industry or in some other government agency. Much of its work, during the six years it has been in operation, has been in the development of radio aids to flying.

Its work, however, has not been confined to radio alone, but has included many other projects such as flutter recorder, fabric tester, transmissometer, approach lighting, impact-resistant windshield, stall warning device, and others. Among the radio aids developed are the instrument landing equipment and technique, the omni-directional radio range,



OLD AND NEW—The water buffalo assigned to the task of building a runway in China is unperturbed as one of our Fourteenth Air Force planes roars above him. The water buffalo is the principal beast of burden in most of China. Army Signal Corps photograph.

and the aural-visual radio range.

The transmissometer makes a continuous record of the resistance of the atmosphere to the transmission or penetration of light. In other words, it makes a visibility record. A narrow beam of light, carefully calibrated, is directed at a distant photoelectric cell. The response of the cell varies with the amount of light coming through.

The station is working on an experimental high intensity beacon, consisting of a series of evacuated glass coils, through which a bank of condensers discharges several thousand amperes at about 3,000 volts. The resulting flashes are of about 50,000,000 candlepower, visible to approaching planes in daylight but too bright to be used in darkness.

The station, also, has on the landing field an installation of two-color boundary lights. They show red from the airport side, and green from the outside. It has a glide path indicator that shows a flashing light to an incoming pilot. If he is on the correct gliding path for a landing, the light appears white. If he is above the correct path, the light appears green, and if below the light appears red.

All CAA traffic control towers are already equipped with the VHF system to assist instrument landing. Before the system can be put into full use commercial

and other planes will have to be properly equipped. There is a necessary transition period, and during it control towers will

necessarily use their older existing equipment as well as the new VHF equipment.

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MEDICINE

Pain of Shingles Relieved

Injectons of the local anesthetic, procaine hydrochloride, into appropriate masses of nerve cells gives instant relief from herpes zoster.

► THE INTENSE pain of herpes zoster, or shingles as it is popularly known, can be relieved instantaneously and permanently by a nerve block treatment, Dr. Thomas Findley and Dr. Reynold Patzer, of Tulane University School of Medicine, New Orleans, report. (*Journal, American Medical Association, Aug. 25.*)

The treatment, known technically as paravertebral procaine block, consists of injections of the local anesthetic, procaine hydrochloride, into appropriate masses of nerve cells. The method is not new. It was reported by Dr. S. Rosenak, of Budapest, in 1938 and by an American physician, Dr. A. Street, in 1943. Physicians generally, however, are not acquainted with the method, it appears from the report of Drs. Findley and Patzer.

A woman who had had "virtually no rest" for seven days in spite of large amounts of sedative and pain-relieving drugs was completely relieved of the severe pain within 10 minutes after the nerve block was performed. She is among the four patients whose cases are reported by the New Orleans physicians.

A total of 29 cases, including these four, has been reported so far as having had this treatment. In only two was there failure to produce prompt and lasting relief.

Besides the prompt relief from pain, the blisters heal rapidly.

The treatment is not difficult, the physicians report, and "practically without danger if only procaine or allied anesthetic drugs are used and if one is familiar with anatomy."

A virus closely related to that of chicken pox is the cause of shingles, or herpes zoster. The condition is an acute inflammation of certain spinal ganglions, or collections of nerve cells, with various degrees of degeneration in corresponding sensory nerves. The extent of the skin eruption seems to parallel the intensity of the nerve inflammation.

The nerve block treatment relieves the

pain, the physicians state, by interrupting a vicious cycle of nerve impulses and abolishing the blood vessel spasm resulting from some of these impulses.

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GEOPHYSICS

Magnetic Survey Shows Probable Petroleum Areas

► A MAGNETIC survey, by the U. S. Bureau of Mines, of the Florida peninsula shows areas in the lower part of the state that are favorable for the occurrence of petroleum. This first examination of almost an entire state has proved also the usefulness of this type of geophysical investigation for mineral and petroleum exploration over large areas, according to Dr. R. R. Sayers, Director of the Bureau.

Speed, economy, and the large amount of information obtained about the geology and sub-surface bedrock topography of a region are the outstanding advantages of this survey method, he states. A magnetic survey is the logical start in undertaking geological surveys of large areas, especially in regions devoid of out-crops.

Essentially, a magnetic survey is a method of determining the contours of the underlying granites and other formations—known to the geophysicist as the "crystalline basement." A knowledge of the crystalline basement, particularly in areas covered by marine sediments, he explains, is of fundamental importance to oil exploratory work.

Long ago it was observed, he continues, that magnetic masses within the earth, such as iron deposits, would affect an ordinary compass. These localized magnetic forces now have been harnessed by the precision instruments used in a magnetic survey. Employing a magnetic needle free to swing in a vertical arc, they measure variations, known technically as "anomalies," between local magnetic attractions and the normal magnetic field. With this information it

is possible to locate magnetic ore bodies, and many other geological formations.

A technical report of this Florida survey has been prepared by the Bureau of Mines and is available at the Washington office.

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Mosquitoes of the genus *Psorophora* have the habit of laying their eggs in grassy areas that are likely later to be flooded by heavy rains; when the lands are flooded, the larvae hatch out and have water in which to develop.

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ORNITHOLOGY

Migration Is Not Homing

Phenomena often considered similar are in reality direct opposites. Experiments on crows show that young birds make long flights unguided.

► THE HOMING flight of pigeons and the autumnal and spring migrations of many other kinds of birds, often considered similar phenomena because both involve the unerring finding of a distant goal, are in reality direct opposites, Prof. William Rowan of the University of Alberta declares. (*Science*, Aug. 24.) Prof. Rowan is well known as the first scientist who discovered that the decreasing length of daylight hours is the physiological "trigger" that sets birds off on their long flights southward as winter approaches.

When a pigeon flies home, he points out, it really is going home—that is, to where the nest is. Pigeons never migrate. When migrating birds fly south in autumn they are turning their backs on home. Even when they come back in spring they do not usually return to the same home, in the sense of exactly the same spot. They come back to the same neighborhood or general region, and as a rule set up new homes.

It still leaves the nature of the migrating impulse, and especially the guides or landmarks by which the birds find their way, very much in the dark. The problem is made the more difficult by the fact that in many species the young of the season, which have never been south before, fly separately from, and often in advance of, the flocks of their elders, so that they have no experienced guides with them. Yet even the antarctic penguins, which migrate northward by swimming when the southern hemisphere winter closes in, reach their rookeries on the shores of South America through hundreds of miles of murky water.

Prof. Rowan relates an experiment he undertook with young crows a few years ago:

"On Nov. 9, 1940, approximately a month after the last resident crow had gone south, I liberated 54 young crows of the year near Edmonton, Alberta, from the area on which they had been hatched and subsequently trapped as juveniles in July and August. They were merely held in a spacious flying cage during the intervening period; no adults were with them.

"By Nov. 20 over 50% had been re-

taken, the farthest 250 miles southeast of the point of liberation on a line directly joining Edmonton and central Oklahoma, the wintering ground of 95% of Alberta crows. None of the birds recovered had deviated materially from this line and some of them were traveling at 50 miles per day, a remarkable rate for crows. The temperature was below zero Fahrenheit and the ground blanketed with snow."

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ENGINEERING

TVA's Newest Dam Performs Satisfactorily

See Front Cover

► TESTS were made on Fontana dam's spillway tunnels, shown on the front cover of this *SCIENCE NEWS LETTER*, over a three-hour period by spilling about 2,400 acre-feet of water at varying rates of discharge up to 20,000 cubic feet per second. Maximum design capacity is 200,000 cfs. The Fontana spillway is

unique in many respects. Unlike a conventional spillway which discharges an overflow down the face of the dam, the Fontana spillway consists of a pair of parallel tunnels drilled through the solid rock of the mountainside which forms the east abutment of the dam. Each tunnel is 34 feet in diameter and approximately 1,000 feet long. The spillway crest at the entrance to the tunnels is at elevation 1675 and the outlets, several hundred yards downstream from the dam, are at elevation 1270. Each tunnel is intersected by a horizontal sluice tunnel at elevation 1590. At the height of the discharge during the test, water raced through the spillway tunnels at about 100 feet per second (around 70 miles an hour). On hitting the huge "bucket" deflectors at the tunnel portals, the water shot more than 100 feet into the air and spread in a fan-shaped spray extending 400 feet downstream. The action of the water on the river bed moved, as was expected, about 14,000 cubic yards of rock. Wind velocities up to 40 miles an hour were recorded in the gorge. Prior to construction of Fontana Dam, exhaustive tests on scale models were conducted at the TVA hydraulic laboratory at Norris to determine the feasibility of the unique spillway.

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The *drone-fly* is so named because it resembles the drone honey bee in appearance.



EXCESS POWER—Shooting out from Fontana's spillways, excess waters from Tennessee Valley Authority's newest dam are dispersed into a vast spray to reduce erosion.

AERONAUTICS-VOLCANOLOGY

Eruption Seen from Air

Helicopter over Paricutin enables geologists to make inspections in a few minutes that otherwise would have required many hours of climbing.

By CHRISTINA BUECHNER

► AS THE first woman to fly in a helicopter over the Mexican volcano Paracutin near Uruapan, this correspondent had a feeling of viewing very closely a natural drama from a grandstand seat in a show window.

There was no feeling of danger in sitting in the transparent bulge of the cockpit while Flight Officer Roy P. Beer buzzed the crater in the Army's hovering helicopter R6A, one of the many flights made during two weeks of exploration that simultaneously tested this unusual craft's performance at high altitude and explored the erupting volcano. There was so much of interest to see that there was no time for feeling afraid.

Our take-off was from the helicopter camp just beyond where the lava ceased to flow some months ago after engulfing the little town of San Juan Parangaricutiro, leaving only the steeple of the church in sight. The helicopter needs only a little clear space to land and take off. From this 7,200 feet above sea level, the helicopter rose to 1,500 feet above the crater which rises a thousand feet above what was merely a cornfield from which the volcano burst forth 2½ years ago.

This was considered by the officers of the Air Technical Service Command of Wright Field, Ohio, in charge of the aeronautical aspects of the expedition, as very satisfactory flying for a helicopter that was built to operate at lower altitudes.

Idling over the volcano and its lava beds, the helicopter has carried the American and Mexican volcanologists on flights that in several cases allowed prompt observation and study of new volcanic activity that would have ceased before the areas could have been reached tortuously on foot. Several landings were made near such newly active areas and the geologists were able to make inspections in a few minutes that otherwise would have required many hours of climbing.

Around the jagged and sometimes still warm lava beds the convection currents are strong, the air is bumpy and flight

is turbulent.

Because of the rainy season less than half of the daylight hours have been suitable for observations during approximately two weeks that the expedition has been at the volcano. There have been more than 30 hours of flying with about 60 flights. Forty of these gave the geologists close views of the crater, and many times the pilot dropped down to within 300 feet of the crater's rim.

The scientists who did most of the observing were: Dr. Ezequiel Ordonez, leading Mexican geologist, Dr. L. C. Graton of Harvard, and Dr. W. F. Fosha of the U. S. Geological Survey and U. S. National Museum.

"Flying in the helicopter was one of the greatest experiences of my life," white-haired Dr. Ordonez told me. "I never really saw the volcano until I saw it from this slowly moving aircraft."

It was Dr. Ordonez who arrived at the volcano within 48 hours after it was born and who has spent many months observing it since.

Still and motion pictures, mostly in color, have been used to map the interesting structure that can best be seen from the air. Unusual lava flow formations, unsuspected from the ground even when crossed laboriously on foot, have been studied. The helicopter was able to come down within a few tens of feet over the rugged lava and sharply circle the point under observation. Conventional airplanes would have traveled too fast to allow such observations.

Helicopter data acquired on this expedition will permit more efficient operation of helicopters in the China-Burma-India theater, according to Capt. George Colchagoff, commanding officer of the Air Technical Service Command expedition. Helicopter experts of the Army were aided by Igor Sikorsky, inventor of the helicopter, and Ralph Alex, helicopter designer, who were both members of the expedition.

The helicopter will be flown to Mexico City and then dismantled and packed for the return trip aboard the same cargo C47 plane in which it was transported to Mexico from Wright Field.

Living in rough dwellings and Army

tents, the expedition feasted on an unusual mixture of native Mexican food and Army C rations. A Trascan woman from the region cooked for the party and the menu consisted of local dishes built around the Army issue.

The American scientist who has been hunting for lightning in the eruption of Paricutin, Mexico's volcano, had his waiting rewarded when at least a hundred lightning flashes occurred within two hours in the Paricutin cone of eruption.

Dr. O. H. Gish of the Carnegie Institution of Washington found some of these were mere sparks and others were two-thirds of the visible height of the cone or about 800 to 900 feet in length. Quite a few of the lightning flashes were in the crater or on the cone. Some of the short ones were in the clouds, and some of the flashes were horizontal and others were at an angle.

These lightning observations will be studied because of their relationship to lightning conditions met with by airplanes in storm clouds. Both from the standpoint of air transport and the weather these new observations will be interesting, and Dr. Gish will report his findings to the U. S. Weather Bureau upon his return to the United States.

Within five miles of the volcano's cone, the ash from the volcano is too thick to allow any plants to grow from seed, Dr. W. A. Eggler of Central Michigan College, and his associates, have found as a result of a survey to determine what plants survived and what plants are returning to the volcano-devastated region.

In the area of thick ash only those continue to grow that have well-developed roots or underground stems. Such plants can grow up through the ash.

The trees that survived best under the blanket of fine dusty material blown out of the volcano are oak and madrona, with pine somewhat less hardy. Such trees are found within a mile of the volcano. When the ash is as much as ten feet thick, trees will nevertheless survive, although they look sickly.

Prickly poppy is growing up from its roots through the earth in the old corn fields and so is grass.

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Cotton production in southern Brazil has developed faster than in any other major cotton-growing section in the world; from an average of 40,000 bales in the five year period ended in 1930, production has now increased to over 2,000,000 bales.



JAP CYCLOTRON—Japanese scientists and laboratory workers at the Institute for Physical Research, Tokyo, with the cyclotron they built.

PHYSICS

Japs Have Cyclotron

Is copy of the one at the University of California. Scientists in Tokyo in 1940 discovered neptunium, one of new elements used in work on our atomic bomb.

► THE JAPANESE, as well as the Germans, during the war had their own program of atomic research, similar to the program that in the United States led to the development of the new atomic bomb. In 1940, Japanese scientists announced discovery of element 93, one of the new elements used in making the atomic bomb in the United States.

In 1938, in Tokyo, a giant cyclotron was nearing completion which was a duplicate of the one under construction at the University of California. It was intended to be one of the largest and most powerful in the world.

A 210-ton electromagnet had been installed, marking the halfway point in the construction of the cyclotron. It was expected to develop 20,000,000 volts.

Money for the Japanese atom smasher was made available by the Society for the Advancement of Science when an older 3,000,000-volt cyclotron was declared inadequate for their atomic research.

In charge of the new cyclotron was Dr. Yoshio Nishina, of the Institute of Physical and Chemical Research in Tokyo. Dr. Nishina was one of a research team of five Japanese scientists who in June, 1940, announced the manufacture of the element 93, now named neptunium. Other scientists in the group were T. Yasaki, H. Ezoe, K. Kimura and M. Ikawa.

They made their neptunium by bombardment of uranium with fast neutrons. Announcement of this Japanese achievement was made in the United States in the same issue of the *Physical Review* which contained details of the discovery in Berkeley, Calif., of the element 94, now called plutonium, and positive identification of the element 93.

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The value of *vitamin C* in tomatoes closely parallels the amount of sunlight received by the plant for about two weeks before harvest.

GENERAL SCIENCE

Make Knowledge Available To People, It Is Advised

► SCIENTISTS and other educators were advised to come out of their ivory towers and make their teachings available to all the people, in an address by Dr. William Seifriz, of the University of Pennsylvania, speaking in New York before the Sixth Conference on Science, Philosophy and Religion.

American scientists, he said, have been inclined to feel that the publicizing of the teachings of scholars is undignified and that to leave the ivory tower for the world of ordinary people is a betrayal of one's class.

"Education," he said, "must be both liberal and free, free of influence from the outside and free of propaganda from within, and above all free of political and financial control. These basic principles need not deprive education of the right to sell its wares.

"When one considers the tremendous efforts made and moneys spent by big business, by politics, by the press, and by religion to maintain position and increase power, the university becomes a very feeble competitor indeed.

"I do not recommend pressure advertising, but greater effort should be made to bring the teachings of the university to the people. This can best be done by having the people come to the university, but the university can also go to the people, through the press and the lecture."

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PUBLIC HEALTH

Americans Gave 50% More To Polio Fund This Year

► THE AMERICAN people gave 50% more money to the National Foundation for Infantile Paralysis in 1945 than in 1944.

Contributions to the 1945 March of Dimes totalled \$16,589,874. The 1944 contributions totalled \$10,973,491, Basil O'Connor announced.

Though many may think of the foundation only during epidemic seasons and at the time of the March of Dimes, its work and that of its chapters goes on the year round. Half of the funds raised are used to finance research and a program of education to train new polio fighters. The other half is retained for services to infantile paralysis victims in and out of epidemic seasons.

Science News Letter, September 1, 1945

AGRICULTURE

Early-Cut Hay Best For Milk Production

► **LARGEST** amount of milk is produced on hay cut at the full-bloom stage, it has been found in experiments at Cornell University.

Early-cut timothy produced 95% as much milk, and the late cut only 90% as much.

Not only does hay made at the full-bloom stage of the grass have the greater milk-producing value, but it also has the greatest total yield to the acre—2.56 tons for the season as compared with 2.32 tons for the early cutting and 2.53 tons for the late cutting.

The three hays were graded after curing. The early-cut molded during the barn-curing process; the medium cut, or full-bloom, was rated No. 1, and the late-cut, or seed stage, as No. 3. The scientists observed, however, that the cows ate larger amounts of the moldy hay than they did of the late cutting, and produced more milk.

Chemical studies were also carried out, showing that the earliest two cuttings retain a high carotene content after several months—enough so that six to nine pounds per day of the hay would furnish sufficient vitamin A value to insure successful reproduction in cows. In contrast, about 30 pounds of the late-cut timothy would be required for successful calving.

The study is being repeated before final conclusions are drawn.

Much of the hay harvested and fed in New York and Northeastern states is made from timothy and mixed grasses.

Science News Letter, September 1, 1945

ORDNANCE

Glass Armor Protected American Seamen

► **GLASS** armor sounds like something out of the Arabian Nights or the tales of King Arthur's Round Table; nevertheless it was extensively used in actual combat by the Navy during the recent war, and was also worn to some extent in combat ashore by the Marines. The story, hitherto held restricted, has now been released by the Navy.

The glass is in the form of exceedingly tough spun-glass fibers woven into fabric and impregnated with a hard plastic. It makes plates that are claimed to give better protection, weight for weight, than steel. It has the considerable advantage over steel of not throwing off injurious

splinters if struck by fragments of exploding projectiles. The plates are placed in pockets in life vests or other garments, and may be jettisoned at will.

Although the new armor material has been used mostly by the Navy, it was originally an Army development. It was invented by Brig. Gen. G. F. Dorion, Q.M.C., and has been given the name Doron in his honor.

Science News Letter, September 1, 1945

PUBLIC HEALTH

Check Child's Health Before School Opens

► **IN THESE** last few days before school opens, parents who have not already done so should make haste to have the children's health checked by the family doctor, or to finish carrying out his earlier advice for correction of health defects.

"Every child should enter school in September with a clean bill of health, with no handicap to deter him in his studies or make him a health hazard to other children," the Indiana State Medical Society has declared. Other health and medical authorities will agree.

If the children have not yet been immunized against diphtheria and whooping cough and vaccinated against smallpox, these protective measures should be started without delay. The children may have had these immunizations during their first year of life. The doctor may think it wise, however, to repeat the smallpox vaccination and to give another Schick test to learn whether the child still has good protection against diphtheria. This is particularly important for the child entering school for the first time, since he is the one most apt to catch any disease which another child in school may have.

The doctor will probably weigh the child and measure his height. These will be checked against the child's own record of the previous year, to see whether he is growing and gaining as he should. Comparisons of weight and height between one child and another of the same age do not mean as much, because children, like grown-ups, vary in build.

Eyesight and hearing, of course, will be checked to make sure the child is not being handicapped at school by inability to see the blackboard or lesson books or to hear the teacher clearly. Many a child has been labelled stupid or disobedient when his trouble was an unsuspected case of poor eyesight or poor hearing.

Science News Letter, September 1, 1945

IN SCIENCE

MEDICINE

Rh Blood Factor Is Absent in Chimpanzees

► **THE RH** blood factor, which in humans may cause danger and even death in the case of repeated transfusions into the veins of individuals not having it, was absent in 15 chimpanzees tested by Dr. Alexander S. Wiener, of the Office of the Chief Medical Examiner, New York City, and Dr. Marjorie Wade, Yerkes Laboratories for Primate Biology, Orange Park, Fla.

The Rh blood factor was so named by the scientists who identified it in the blood of rhesus monkeys. Apparently all rhesus monkeys have it. Different races of mankind vary somewhat in the proportion having the Rh factor; in the United States about 85 out of a hundred are Rh positive and the other 15 have the Rh negative incompatible blood.

No theory is proposed by Drs. Wiener and Wade to account for the fact that the man-like ape, the chimpanzee, should be Rh negative.

Science News Letter, September 1, 1945

INVENTION

Sleeping Cars May Have Nothing But Lower Berths

► **A SLEEPING-CAR** with as many berths as the present Pullmans yet without any of the unpopular "uppers" is the novel invention on which patent 2,382,402 was granted to T. de Roode of New York City. The seats are single, instead of double as in the present-type sleepers. At night they are folded down in such a manner as to provide two parallel rows of berths on either side of the central aisle; but these are in a staggered position.

Since most persons are wider in the middle than they are at head and feet, each berth is built with a wide middle and narrow ends, so that the staggered construction is calculated to give a maximum amount of accommodation with a minimum waste of space.

Upper berths (at least one row of them) may also be lowered from the wall if desired; in this case the car simply gains in number of passengers who may be carried.

Science News Letter, September 1, 1945

THE FIELDS

ENTOMOLOGY

Mosquitoes Now Made To Shine in the Dark

► MOSQUITOES aren't being given a break at all any more. First they produce improved repellents, that drive them off a tempting area of exposed human skin with a disappointed "zing!" Then they turn up DDT, which is sure death in submicroscopic doses. Now they spray them with stuff that makes them shine in the dark, so their nefarious goings and comings can be traced.

Not that the pests are being crossed with lightning-bugs. Neither is their glow intended for the suffering individual 'skeeter-slapper on porch or lawn. The new trick is primarily for the use of mosquito-fighting scientists, who want to find out which way and how far the insects fly.

The mosquitoes are marked for later identification by spraying or dusting them with fluorescent compounds—those chemicals that shine with a glimmering light of their own when irradiated with the "invisible light" of ultraviolet rays. Three different compounds have been tested so far, by Dr. John W. Zukel of the U. S. Public Health Service; they make the mosquitoes fluoresce with blue, red and green glows. When mosquitoes thus marked are later recaptured, it is very easy to identify them and to tell where they came from.

Science News Letter, September 1, 1945

RADIO

Television Broadcasts Unaffected by Plane Crash

► SCHEDULED television broadcasts from the tower of the Empire State building in New York were unaffected by the recent crash of an Army plane into the building below the tower, and there was no injury to the new installation, just completed, to be used in conducting field tests to study problems faced in employing higher frequencies in television broadcasting. A regular broadcast was on the air two hours after the crash, and no special difficulties have shown up since.

Scaffolding about the tower used in the erection of the new television transmitter, atop the building 1,250 feet above the street, had been removed only a day

or two before the crash, the installation being completed but not yet in use. When testing starts it will be conducted by the Radio Corporation of America in cooperation with the National Broadcasting Company, which operates the regularly scheduled television programs. The tests will in no way interfere with the regular broadcasts.

The new installation, to study the problems of using higher frequencies in television broadcasting, will employ a new transmitter capable of developing five kilowatts of output power at 288 megacycles, a somewhat higher frequency than now assigned by the Federal Communications Commission for commercial television transmission.

The primary purpose of the new station is to ascertain the service area of a transmitter operating in these higher frequencies. The present television audience in the area will be unable to pick up the test broadcasts which will be received only on specially-designed receivers in possession of the survey engineers.

Science News Letter, September 1, 1945

ENGINEERING

Petroleum Research Centers to Be Established

► A GIGANTIC science laboratory, housed in eight buildings, will soon be under construction in Linden, N. J., for the Standard Oil Development Company, and will contain, it is claimed, the world's most modern and extensive research equipment in the oil industry. One building for similar work will be erected for the same company at Baton Rouge, La.

The new laboratories at both locations will be used not only for developing improved products for oil and methods for producing them but additional extensive work on extending sources of supply of oil products will be carried out.

This latter work will include production of oil from natural gas, gasification of coal, production of oil from coal and from other carbonaceous deposits such as oil shale.

Basic studies will also be conducted on the application of catalytic processes to derive chemical raw materials from petroleum. One section of the new plant will be devoted to research on extremely low-temperature polymerization, important in the field of new plastics. A process of this nature is the basis of the synthetic butyl rubber, which is a product superior to natural rubber for inner tubes in automobile tires and for certain other purposes.

Science News Letter, September 1, 1945

RESOURCES

Creosote-Pitch Mixture Used as Fuel in England

► A COAL TAR fuel widely used in the United Kingdom during the war years, and still in use, has been described by the Ministry of Fuel and Power in London. It is a creosote-pitch mixture, with about equal parts of the two substances, and is made entirely from English-produced materials.

More than 500,000 tons of this fuel are now being consumed annually in Great Britain, and this represents approximately two-fifths of the total amount of liquid fuel at present burnt in English industry. It is similar to fuels used by some plants before the war, and even during World War I. This, however, is not to be regarded, the Ministry states, as a "second best" fuel, to be tolerated only until such time as other liquid fuels become available.

The 50-50 creosote-pitch fuel mixture is homogeneous, and the so-called free carbon consists of microscopic particles of resinous material, which, when the fuel is held in storage at from 80 to 90 degrees Fahrenheit, remain permanently dispersed.

Heating equipment formerly used with other liquid fuels can be used with this coal tar product, provided certain minor adjustments are made. If formerly used with petroleum fuels, the equipment must be thoroughly drained and flushed with hot creosote oil, because if petroleum fuels are allowed to mix with tar fuels, the resinous matter in the latter is immediately precipitated.

Science News Letter, September 1, 1945

PUBLIC HEALTH

Increase in Polio Cases Slight; Peak May Be Near

► INFANTILE paralysis cases increased only slightly during the week ending Aug. 18, giving rise to the hope that the peak of cases for this season may be near or even passed. The total number reported to the U. S. Public Health Service was 692. This represents an increase of only 21 over the previous week's total, when cases jumped by 197 to reach a total of 671. The total number of cases since Jan. 1 is 4,276, compared to 6,262 for the same period last year.

States reporting increases this past week were New York, New Jersey, Pennsylvania, Illinois, Virginia, Tennessee and Texas.

Science News Letter, September 1, 1945

ASTRONOMY

Planets Rise Late

The first to arise, Mars, appears around midnight. Saturn appears in the east about 1:00 a.m. Venus comes up about three hours before sunrise, Mercury at dawn.

By JAMES STOKLEY

► TO SEE a planet during the month of September, moderately late hours will be required. The first to arise, Mars, appears in the northeast around midnight, after which it will be seen for the rest of the night. Red in color, and equal to a first magnitude star, it will not be difficult to find.

Because of its late rising, it does not manage to get on the accompanying maps, which show the appearance of the sky at about 11:00 p.m., your own kind of war time, on Sept. 1 and about 10:00 p.m. at the middle of the month. They can, however, be used earlier in the evening without difficulty. Simply remember that the stars, like the sun, move across the sky from east to west. Therefore, a little earlier than the times given, the whole group of stars indicated will be shifted a little to the east. Stars shown on the maps as low in the east may not then have arisen, while others that are not shown will still be on view in the west. Those high in the south will look pretty much the same.

The brightest of the stars to be seen these evenings is Vega, high in the west in the figure of Lyra, the lyre. Directly overhead is the Northern Cross, otherwise known as Cygnus, the swan, with bright Deneb at the top of the cross, toward the north. Below Cygnus, to the south, is Aquila, the eagle, with Altair, another star of the first magnitude.

Three Others Indicated

Three other first magnitude stars are indicated on the maps. As they are all near the horizon, they look fainter than they do when higher, on account of the absorption by the greater length of the earth's atmosphere through which their light has to pass. Low in the south is Fomalhaut, in Piscis Austrinus, the southern fish. In the west we see Arcturus, in Bootes, the bear-driver, while coming up in the northeast is Capella, in Auriga, the charioteer.

Though not of the first magnitude, another easily recognized stellar figure now in a good position is the Great Square in Pegasus, the winged horse, seen high

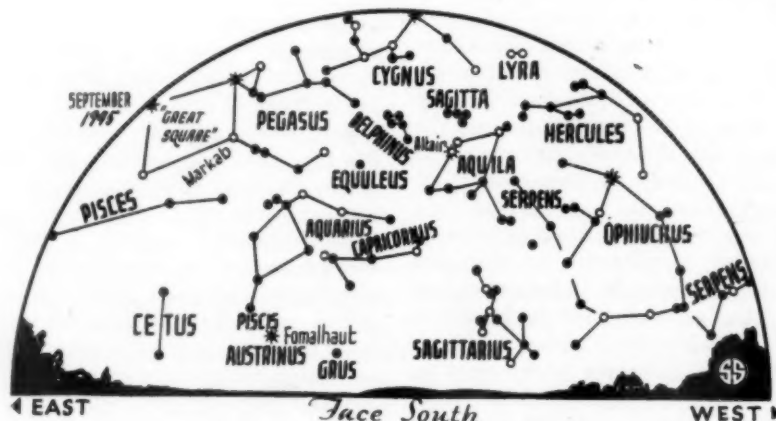
in the east. Just below Lyra, in the west, is Hercules, the strong man, some of the stars of which form a letter H, while others see it as a butterfly. Directly under Cygnus, to the south, is the little figure of Delphinus, the dolphin, sometimes known as Job's coffin. And near it, to the right, just over Altair, is another of the smallest constellations, Sagitta, the arrow, a group which has no known connection with Sagittarius, the archer, low in the south.

In the north the Great Dipper is nearly at its lowest position of the year. Directly above it is the winding line of stars that make up Draco, the dragon, twisting themselves around the Little Dipper, which has the pole star at the end of its handle. To the right of the pole star is Cassiopeia, the queen, shaped like a

W tilted to the left. And between Cassiopeia and Ursa Minor, of which the Little Dipper is part, is Cepheus, the king.

After Mars, the next planet to appear these September nights is Saturn, which is in the group of Gemini, the twins, appearing in the east about 1:00 a.m. Of magnitude 0.4, it is appreciably brighter than Mars. Venus, brightest of all, with magnitude minus 3.4, comes up in the east about three hours before sunrise, in Leo, the lion. About Sept. 6 Mercury, then of zero magnitude, reaches its greatest distance west of the sun when at sunrise it is about 16 degrees above the horizon. This means that around this date you may be able to get a glimpse of it, low in the east, as dawn is breaking.

Besides being the brightest star now seen, Vega has other points of interest. For one thing, it will be the pole star about 14,000 A.D., as it was around 12,000 B.C. This is an effect of the movement known as precession (sometimes



★ ★ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

misprinted procession) of the equinoxes, a slow wobbling movement of the earth's axis by which in the course of nearly 26,000 years it traces out a large circle in the sky, bringing various stars into the position of the pole star.

In Lyra several interesting objects are revealed by the telescope. With Vega there are two fainter stars which form a little equilateral triangle. The most northerly one is epsilon Lyrae, sometimes called the "double double." To a very keen eye what seems at first a single star appears as two, while the telescope shows that each member of the pair is itself double. In Lyra also is the famous Ring nebula, a globe of glowing gas which looks, through the telescope, like a smoke ring in the sky. It cannot be seen at all with the naked eye.

Also close to Vega, just across the border in the next-door constellation of Hercules, is the place where we are going. That is, the entire solar system—sun, planets, and all—are moving through space toward this part of the sky at a speed of 12.2 miles per second. The result of this, incidentally, is that the movement of the earth is in a helix, or corkscrew, and not in a plane circle. This is a fact that has been well-known to astronomers for years, and is fully described in many textbooks, although once in a while some uninformed person suddenly finds it out and thinks he has made a great discovery!

To the south is the figure of Sagittarius, the archer, which has some points of interest, because it is the direction of the center of our celestial city—the Milky Way, or galaxy. All the stars that we see, and a vast number that are only revealed

by the telescope, form a system that has the shape of a bun, or rather thick watch, so large that light takes about 100,000 years to cross it. This, even though the speed of light is 186,000 miles every second. The center, toward Sagittarius, is about 30,000 light years away.

The glowing path of light that we call the Milky Way is simply the edge of the galaxy, for when we look toward it we see more stars than when we look to the sides. But vast though this galaxy is, it is only one of many such systems in the sky, which again makes us realize the minute part of creation that is occupied by man and his works.

Celestial Time Table for September

Sept.	EWI	
2	6:57 a.m.	Moon passes Saturn
3	6:41 a.m.	Moon passes Venus
4	5:49 p.m.	Moon passes Mercury
6	8:00 a.m.	Mercury farthest west of sun
	9:43 a.m.	New moon
7	8:04 p.m.	Moon passes Jupiter
10	8:00 p.m.	Moon farthest, distance 252,000 miles
14	1:38 p.m.	Moon in first quarter
21	4:46 p.m.	Full moon
22	midnight	Moon nearest, distance 223,500 miles
23	5:50 a.m.	Sun crosses equator, autumn commences
28	7:24 a.m.	Moon in last quarter
	7:39 p.m.	Moon passes Mars
29	4:26 p.m.	Moon passes Saturn
30	7:00 p.m.	Moon passes Mercury

Subtract one hour for CWT, two hours for MWT, and three for PWT.

Science News Letter, September 1, 1945

MEDICINE

Sailors and Marines Used Cold Cream and Lipstick

► HARDBOILED sailors on our fighting ships used cold cream, and Marines on sun-scorched Pacific isles carried lipsticks. These now-it-can-be-told secrets

came out in the course of a radio address by Rear Adm. Harold W. Smith, chief of the research division in the Navy's Bureau of Medicine and Surgery.

However, the cold cream was anything but a boudoir luxury. It was a specially developed protection against the painful type of injury known as flash burn, which our men risked whenever they went into action stripped to the waist.

Similarly, the lipstick wasn't an item you'd be likely to find in any lady's handbag. Its color is a most unglamorous gray-brown—but it is an effective preventive of the painful sunburn that afflicts men's mouths and noses where the sun pours on an excess of "hot" ultraviolet rays.


These, of course, are relatively minor products of naval medical research, Admiral Smith explained. As examples of larger undertakings that saved many lives under strenuous field conditions he cited the whole prepared blood program, the anti-G suits that kept flyers from "black-ing out" at the bottom of a high-speed dive, and the emergency kits with which all life rafts are now equipped.

Admiral Smith spoke as guest of Science Service on the CBS public service feature "Adventures in Science."

Science News Letter, September 1, 1945

Tomatoes, pole beans, cucumbers and squash can be trained to the garden fence.

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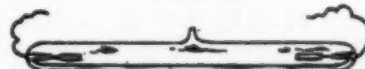
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Do You Know?

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Infra-red light is now used in drying the finish on furniture.

The black seeds of the male *peony* were once recommended for sufferers from nightmares.

During the summer a square meter of leaf surface evaporates about fifty grams of water per hour.

Crooked streams retard the rate of flow of water from 30% to 60%; vegetation growing in the stream bed also retards flow greatly.

It was not until 1791 that the scientist *Dalton*, himself colorblind, described the now familiar phenomenon of red-green colorblindness.

When several electric *eels* are together, one or two will discharge their electricity to paralyze food for all, thus allowing the others to keep their electricity in reserve.

Cattail fluff, from the ordinary swamp cattail, is now used in large quantities as a stuffing in upholstery and for other purposes; it is buoyant and well suited for life-saving equipment.



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ENTOMOLOGY NATURE RAMBLINGS by Frank Thone



Alien Ally

➤ INSECTS introduced from foreign lands are almost invariably regarded as pests. We automatically think of them in terms of Japanese beetle, Oriental fruit moth, Hessian fly, European corn borer and similar terms. It is no wonder, therefore, that so far as insects are concerned we all tend to be xenophobes, and look upon aliens only as undesirable aliens.

This is not necessarily the case, however. Foreign insect species may be harmless or even useful, just like foreign-born human beings. They do not irritate or annoy us, they do us no harm, and after a while we come to think of them as having been here "always"—like Mayflower descendants.

A noteworthy case of this kind, conspicuous because the creature itself is so conspicuous when you see it at all, is that of the Oriental mantis. Ordinarily we seldom see this big, rather awesome-looking insect; but when nights begin to become cool in autumn the species tends to migrate, and many specimens blunder aimlessly into cities and are thus noticed and captured.

The Oriental mantis is a formidable object to look at, even for us relatively gigantic human beings. It must be a veritable death-ogre in the insect world, for it preys on other insects as a tiger does on deer or goats, and for its size is even more bloodthirsty. The female even devours her mate, so that the wandering individuals we see are practically always of the deadlier sex.

The mantis' mode of operation is direct and simple—and a bit spine-chilling to watch. She waits motionless while her unsuspecting prey—a grasshopper, perhaps—wanders within range of those powerful, spine-armed forelegs that are

usually held in an attitude of seeming prayer. Then those tongs of doom snap on it like a trap, and despite all struggles the mantis proceeds to gnaw deliberately into the doomed victim's vitals. You find yourself beginning to feel sorry for the grasshopper, even though the front of your brain tells you that the 'hopper is your enemy and the mantis your ally.

How and when the Oriental mantis got to this country nobody seems to know very exactly. It is native to eastern Asia, including Japan, and it is common in this country mainly along our own eastern seaboard. Probably it was introduced in the form of unhatched eggs, on imported nursery stock. At any rate, it has largely displaced the much smaller native American mantis within the range it has taken over. Nobody cares much, for such effects as it has on the insect economy of the wild are on man's side of the fight. Except for the matter of relative size, it might be termed an insect Nisei.

Science News Letter, September 1, 1945

Fossil redwood cones have been discovered in the badlands of Dakota.



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MEDICINE

Cancer Research Grant

\$4,000,000 will provide for building and in part maintaining a projected cancer center in conjunction with New York's Memorial Hospital.

► A GRANT of \$4,000,000 from the Alfred P. Sloan Foundation to provide for building and in part maintaining a projected Sloan-Kettering Institute for Cancer Research was announced by Alfred P. Sloan, Jr., sponsor of the foundation and also chairman of General Motors. The research center will be organized in conjunction with New York City's Memorial Hospital, which specializes exclusively in the treatment of cancer.

It is estimated that the building itself will cost \$2,000,000. To be located squarely in the middle of Memorial Cancer Center, on property now owned by Memorial Hospital, the building will be especially designed for research and will be self-contained in all its various research functions.

A sum of \$200,000 will be provided each year for ten years to help defray

operating costs. Dr. Charles F. Kettering, vice president and director of research for General Motors, will help supply the general types of techniques long employed in industrial scientific research.

Although part of the Memorial Cancer Center, the institute—which has no relationship to General Motors—will be operated by a separate board of trustees composed of men primarily interested in research. The funds entrusted to the charge of these Trustees can be used for no other purpose than research. All the clinical facilities and material of the other units of the center, however, will be available to the institute. R. G. Coombe, president of Memorial Hospital, stated.

When the expansion program of Memorial Hospital has been completed, Mr. Coombe said, from the center as a base the public may well expect to benefit through improved methods of prevention, diagnosis and treatment. Ultimately the cause of cancer may be found.

"The determination of the cause of cancer is one of the great unsolved problems of mankind," Mr. Sloan stated after announcing the grant. "The impact of the disease on the human race is appalling and, unfortunately, its magnitude too little appreciated. One out of every nine succumbs to its ravages."

The same broad principles of organized industrial research can be adapted to the study of cancer, both Mr. Sloan and Dr. Kettering believe, and the current acceleration of scientific knowledge provides an unusual opportunity for a determined all-out attack on cancer.

Science News Letter, September 1, 1945

VIBRATION Fatigue Testing

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Model 100V in research laboratory of Carl Hussian Engineers, Inc., Chicago, makers of vibration control and stabilization devices.

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five parts of this in a million of water is known to kill fish. In the newly patented treatment the mill effluent is first run into a shallow pool, where fermentation with yeasts or molds breaks down the wood wastes and other organic compounds. Then the frothy mass is slowly trickled down over a series of concrete steps, where oxygen from the atmosphere can act on it. It falls into a second pool, where solid sediments gather on the bottom and can be removed. The liquid floating on top then trickles down another set of aerating steps, and by the time it reaches the bottom has lost practically all of its trouble-making contents.

Science News Letter, September 1, 1945

ENGINEERING

Hermetically-Sealed Buildings for Big Guns

► STORAGE of America's big guns, now silent, and other heavy artillery equipment, where rust, corrosion and dust cannot injure them, is a problem that may be solved by the construction of great hermetically-sealed metal containers to house them, in which the destructive air is replaced by an inert gas. This is the solution recommended by engineers of the U. S. Steel Corporation who devoted months of research and experiment to the problem.

The proposal is for a big welded steel container, resembling the Army Quonset hut. Many steel containers of this type have been constructed and are undergoing further analysis and study. After the equipment is placed in them the air, with its corroding factors of oxygen and moisture, will be replaced with nitrogen or other inert gas which should prevent deterioration over a long period of time.

Equipment so preserved will be ready for immediate use in case it is needed. The container will have to be opened with a welding or a burner's torch.

Science News Letter, September 1, 1945

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INVENTION

Pulp-Mill Wastes Made Harmless to Aquatic Life

► A METHOD for making liquid wastes from paper-pulp mills harmless to fish and other aquatic life is covered by patent 2,382,010, granted to the estate of the late Paul Hodges, formerly of Crossett, Ark.

The principal offender in the class of pulp-mill effluents considered by Mr. Hodges' patent is known as sulfate soap;

• Off Press •

► **THE FIRST** book of a three-volume set for electrical engineers and students, the **FUNDAMENTALS OF ELECTROMAGNETIC ENGINEERING**, by Dr. W. P. King, is now off the press. It covers high frequency transmission lines, antennas, wave guides and wave propagation. It includes information given by the author in a pre-radar training course to Army officers. It is understandable for students with the proper background. (McGraw, \$6)

Science News Letter, September 1, 1945

► **THE STRENGTH** of the Soviet Union rests upon her resources of land and minerals, and upon the dynamic character of her people, according to the geographical book by George B. Cressey, entitled the **BASIS OF SOVIET STRENGTH**. It is a readable volume, with maps and illustrations, containing authoritative information on Russian raw materials, agriculture, industries, racial backgrounds and regional characteristics. (McGraw, \$3)

Science News Letter, September 1, 1945

• Just Off the Press •

BUILDING CONSTRUCTION ESTIMATING—George H. Coorer—McGraw, 282 p., illus., \$3. A textbook for technical and vocational schools.

THE COLUMBUS CLOCK—Willis I. Milham—McClelland, 34 p., paper, illus., \$1.

ELECTRICAL COILS AND CONDUCTORS: Their Electrical Characteristics and Theory—Herbert Bristol Dwight—McGraw, 351 p., illus., \$5.

ELECTROMAGNETIC ENGINEERING: Vol. I. Fundamentals—Ronold W. P. King—McGraw, 580 p., illus., \$6. Radio Communication Series. Expanded from courses at the Cruft Memorial Laboratory.

EXTINCT AND VANISHING MAMMALS OF THE OLD WORLD—Francis Harper—Am. Committee for Internat. Wild Life Protection, 850 p., paper, illus., \$4. Special Publication No. 12. Cloth ed., \$5.

OLD PAPER SPECIMENS OF THREE CENTURIES—Dave Webb Private Press, 35 p., paper, \$2.50. Ltd. ed. Contains 35 specimens of handmade paper.

POPULATIONS OF THE OTHER AMERICAN REPUBLICS BY MAJOR CIVIL DIVISIONS AND BY CITIES OF 5,000 OR MORE INHABITANTS—Office of Inter-American Affairs, 58 p., paper, free. Handbook of Latin American population data.

THE ROCKEFELLER FOUNDATION ANNUAL REPORT, 1944—Rockefeller Foundation, 344 p., paper, illus., free.

THERMODYNAMIC PROPERTIES OF AIR INCLUDING POLYTROPIC FUNCTIONS—Joseph H. Keenan and Joseph Kaye—Wiley, 73 p., \$2.25.

WORKBOOK IN ELEMENTARY METEOROLOGY—Frederick L. Caudle—McGraw, 188 p., paper, illus., \$1.24.

THE YEARBOOK OF PSYCHOANALYSIS, Vol. 1—A. A. Brill and others—International Universities Press, 370 p., \$10.

Science News Letter, September 1, 1945

METALLURGY

Low-Temperature Process For Separating Magnesium

► **HINT** of possible postwar trends in light-weight motor car construction is contained in a patent issued to Henry Ford and two associates, E. E. Ensign of Ypsilanti and A. C. Quinn of Dearborn, Mich. The patent, No. 2,382,047, assigned to the Ford Motor Company, covers a low-pressure, low-temperature method for getting the light alloy metal, magnesium, out of its commoner ores.

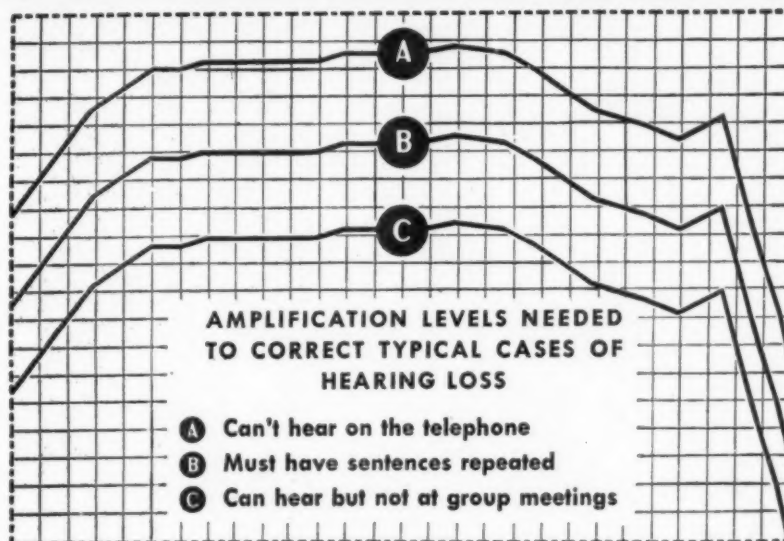
Starting material for the process is preferably dolomite or other carbonate of magnesium. Magnesium oxide may

also be used, but if it is, finely divided carbon must be added. The retort is heated up to a temperature between 2,000 and 2,500 degrees Fahrenheit, while air is pumped out until the pressure is only three millimeters of mercury—approximately only a thousandth of ordinary atmospheric pressure.

The carbon and oxygen are driven off in the forms of carbon monoxide, carbon dioxide and what the inventors call "R" carbon, while the magnetism is released as an uncombined element in vapor phase, which may be cooled to solid, crystalline form after being drawn into a different part of the apparatus.

Science News Letter, September 1, 1945

What Makes a Good Hearing Aid . . . No. 3 of a Series



AMPLIFICATION

• Any hearing aid worthy of the name should provide adequate amplification of sound to compensate for varying degrees of correctable hearing loss.

To illustrate—different levels of amplification that might be needed for three typical cases of hearing loss are charted above. For satisfactory hearing, "A" must set Volume Control higher than "B" . . . "B" higher than "C".

At each level of amplification, frequency response should remain essentially the same. A full range of tones and overtones should give body and clarity to sound. A tone dis-

criminator should be available to cut down annoying low frequency sounds. Intensity of sudden noises should be automatically limited by proper design of the amplifier circuit to prevent transmission of such electronic overloads to the receiver.

The volume control should be engineered for smooth and continuous gradations of amplification to individual needs. Ample reserve output should be available to meet special hearing situations.

THE WESTERN ELECTRIC is one hearing aid that meets these essential amplification requirements.

THIS SERIES, BASED UPON RESEARCH CONDUCTED BY BELL TELEPHONE LABORATORIES IS PUBLISHED IN THE INTEREST OF THE HARD OF HEARING AND THEIR PHYSICIANS

Western Electric Hearing Aids

MADE TO BELL TELEPHONE STANDARDS

• New Machines and Gadgets •

❁ **TRANSMISSION** photometer is an electric device that analyzes the composition of metals by reading a photographic plate of the metals' spectrum. It measures the density of the spectrum lines in the spectrophotograph, thus showing the proportion of alloy in the metal.

Science News Letter, September 1, 1945

❁ **SIGNALING** searchlight, a 12-inch unit used to send colored code messages, is housed in a drum-type casing on a trunnion bracket that pivots on a stationary base. It can withstand the roughest weather and severe repercussion. Nine words per minute can be sent with it.

Science News Letter, September 1, 1945

❁ **DETACHABLE HEELS** for shoes, to make home replacement of worn heels easy, are held in position by threaded machine screws against permanent lifts under the heel part of the shoes in which are threaded sleeves. The head of the screw is countersunk in the removable heel.

Science News Letter, September 1, 1945

❁ **POLARIZING** microscope, that meets the requirements of most polarization microscopy, has an optical system containing Polaroid material in place of the usual calcite prism. It gives a noticeable increase in contrast in the image, it is claimed.

Science News Letter, September 1, 1945



❁ **CIRCUIT TESTER**, vest-pocket size, has a tiny neon lamp on its top that glows when the two contact points are put in an electric circuit, as shown in the picture. The intensity of the glow indicates the circuit condition; no glow shows a dead line.

Science News Letter, September 1, 1945

❁ **ADJUSTABLE** reflector, for a light suspended from the ceiling to permit concentration of light in any desired direction, is an ordinary umbrella-shaped reflector with a hole in its center that fits over a small globe on the supporting

rod. The reflector is rotated on the globe as desired.

Science News Letter, September 1, 1945

❁ **BOX-LIKE** device, somewhat bellows-shaped, to hold and help expel the contents of a shaving-cream or other collapsible tube, has two triangular and two rectangular sides. One of the latter is movable and hinged to the other at one end. When pressed it forces out the contents as needed.

Science News Letter, September 1, 1945

❁ **DENTAL COMPACT** has a toothbrush within it that may be opened out by means of a pivoted joint in somewhat the same manner as the blade of a jack-knife. Beside the compartment in the compact for the closed head of the brush is space for a small vial of dentifrice.

Science News Letter, September 1, 1945

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N. St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 274.

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